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UNION OF CONCERNED SCIENTISTS

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April 9, 1999

James M. Irvin, Commissioner and Chair
Tony West, Commissioner
Carl J. Kunasek, Commissioner

Arizona Corporation Commission
1200 West Washington
Phoenix, Arizona 85007

Arizona Corporation Commission

DOCKETED

APR 12 1999

Re: Solar Portfolio Standard for Arizona

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Dear Commissioners Irvin, West and Kunasek:

I want to thank all three of you for the opportunity to meet with each of you individually regarding the important decision that each of you will be making on April 14, regarding retention of the Solar Portfolio Standard (SPS). At those meetings on April 1, 2 and 5 my intention was to help assure that the larger economic picture and potential jobs and economic benefits of the SPS to the State of Arizona be clearly before you as you weigh your decision. By summarizing a few points in the following in a letter addressed commonly to all three of you, I am continuing my practice of placing the same information before all three of you.

Prior to our meeting I had carefully studied those portions of Docket RE-00000C-94-0165 that were pertinent to the SPS. In addition, I had studied the document "Solar Portfolio Standard Analysis", submitted to your Commission by the Pacific Energy Group. And I had refreshed my knowledge of both predicted and actual economic benefits developed or realized in other states that are now offering incentives to attract new renewable energy businesses for their economic development value.

The question you are addressing is whether the potential costs of the SPS produce economic benefits to the state of Arizona that are not only far greater than the costs, but which can also position Arizona to capitalize on the developing multi-billion dollar solar energy industry. In other words, can a very small solar portfolio standard provide tangible statewide economic benefits at a bargain cost? The conclusion to date from all analyses and from the experience in other states is that this is exactly what you can expect. The following recaps and adds a bit more to the points I made with each of you.

In the analysis performed for you by the Pacific Energy Group of the Arizona SPS in its present form, the potential "direct" benefits to the state could be 600 new jobs by 2010 and \$200 million in wage, salary and state income tax revenue by 2020, as well as environmental benefits which I am not presently trying to quantify. But the authors of that study were careful to point out that they have not included "indirect" and "induced" economic benefits, which are just as real and tangible. How great might these be?

In a study commissioned by the U.S. Department of Energy, "Economic Impacts of a Photovoltaic Module Manufacturing Facility",¹ economic projections of the benefits to the region (in California) of the construction of just one new photovoltaic (PV) manufacturing facility that produces 10MW of cells each year were made using a full input-output (I/O) model. Direct sales of \$40 million per year could produce direct and indirect sales of \$55 million, but including the "induced" output sales the annual regional benefit could become \$308 million. Of this, salaries in the region alone would be from \$32 to \$97 million annually.

While these calculations have not yet been made for Arizona, if they turned out to be comparable (and why not?), the \$308 million total economic benefits from just one modest PV manufacturing plant could be equivalent to an economic return to Arizona of perhaps \$0.50 for every 1,000 kWh customer per month. In other words, attracting just *one* modest sized solar electric manufacturing facility into Arizona by the SPS might possibly return the total cost, or nearly so, of the entire SPS to the State.

The State of Wisconsin Department of Administration performed a similar analysis using the REMI I/O model, to compare the value to the state of substituting 750 MW of potential fossil-fuel fired electricity generation with 750 MW of in-state renewable energy generation.² The result, allowing for the higher costs of the renewable generation and subtracting out the negative economic impacts resulting therefrom, still produced a net economic benefit over 30 years to the Wisconsin GDP of about \$3.1 *billion*. In the context of the energy produced over that same period this would amount to close to 2 cents/kWh *net benefit* to the state by the more expensive renewable energy option, compared to the traditional fossil-fuel fired option. This benefit value is 10 to 20 times the anticipated cost to Arizona of the full 1% SPS.

Alternatively, as I pointed out to each of you, by not capitalizing on the benefits of using in-state solar energy resources, the Arizona economy is in a sense providing a "subsidy" represented by lost potential economic benefits of perhaps the same magnitude (possibly up to 2 cents/kWh) to any conventional power plant using imported fuel (coal or gas), which again greatly exceeds the cost to Arizona of the 1% SPS.

¹ *Economic Impacts of a Photovoltaic Module Manufacturing Facility*, Final Report, EA Engineering, Science, and Technology, Energy Technology Group, May 7, 1992

² Clemmer, S., and Wichert, D., *The Economic Impacts of Renewable Energy Use in Wisconsin*, Wisconsin Department of Administration, Energy Bureau, April, 1994

Again, let me stress that these figures may be quite different when determined for Arizona circumstances, but the consistently positive direction of these benefits cannot be ignored. Indeed, the Wisconsin analysis concluded that "The results show that renewable energy investments produce over three times more jobs, income and economic activity than the same amount of electricity generated from coal and natural gas power plants."

A recent report, "Energy: A Major Economic Development Strategy for Nevada", analyzing the potential impacts and benefits of Nevada's previously-enacted 1% renewable portfolio standard (RPS)³, was delivered to the commissioning organizations--the Nevada State Energy Office, the Corporation for Solar Technology and Renewable Resources (CSTRR), and the National Renewable Energy Laboratory (NREL).⁴ Nevada's portfolio standard is presently the most similar to Arizona, in that it, too, is a 1% standard, but it limits the "solar" portion of that standard to 50% of the total, in view of the significant wind and geothermal energy resources also contained within its boundaries. If the CSTRR goal of 1,000 MW of renewable electricity generation by 2010 can be achieved, this analysis concludes that "...the market potential from the in-state manufacturing and installation of the plants alone will be \$255 million in 2010 and generate 2,700 new jobs in that year."⁵ That same report notes that "Nevada is also a prime candidate for cracking a lucrative new regional renewable energy power market—developing a base of high-technology businesses that manufacture renewable technologies."⁶

It should be apparent that this is the primary economic benefit to a state at present from an early entry into the renewable energy power market. This is perhaps best illustrated by the action of the State of Virginia, which cared less about applying solar energy to its state than it did in getting the lucrative benefits from attracting solar photovoltaic manufacturing plants to relocate in Virginia. Virginia adopted a policy of offering \$0.75/watt for every watt of solar electric cell made in Virginia, up to a maximum public expenditure of \$6 million per year. This is equivalent to a "bonus" worth about 25% to the manufacturers of PV cells on the wholesale sales price of cells made in Virginia. This policy has already attracted three major PV manufacturing plants to locate in Virginia, and is returning many times over the public investment cost.

So two states bordering on Arizona are both now taking active steps to secure a "lucrative new regional renewable energy power market—developing a base of high-technology businesses that manufacture renewable technologies". And one PV plant that could have gone to Arizona went to Virginia, while another is now headed for Nevada. How long is the State with the greatest solar energy resource in the Union going to allow these potential economic benefits to hemorrhage to other regions?

³ "RPS" refers to a "Renewable Portfolio Standard" that includes all of the potential renewables appropriate to a state or region, such as solar, wind, biomass and geothermal. Arizona's "SPS", or "Solar Portfolio Standard", acknowledges that Arizona's primary renewable resource is radiant solar energy, and therefore seeks to stimulate economic development in the technologies that will capitalize on this dominant resource.

⁴ Laitner, S., and Goldberg, M., "Energy: A Major Economic Development Strategy for Nevada", Economic Research Associates, July, 1997.

⁵ Ibid., Executive Summary

⁶ Ibid.

This, in turn, is also the crux of why a "portfolio standard" is a necessary policy basis to capitalize on these potential benefits. A "standard" provides reliable assurance to the industry that a multi-year market will be available, and of a predictable size, a necessary condition for attracting investment capital into the construction of new manufacturing facilities within a state's boundaries.

In states with multiple renewable energy resources, the "portfolio" standard must be complemented by other forms of "systems benefits charges" to assure a balanced portfolio of nearly-commercial and hence lower-cost resources (such as wind and geothermal) with the more expensive "emerging" resources, such as solar thermal and photovoltaics. But in states such as Arizona (and, as we have seen, Nevada), with radiant solar as the dominant renewable energy resource, a more focussed "Solar Portfolio Standard" can serve to attract those industries that can best serve the state's needs, while at the same time yielding the high potential benefits of solar-electric manufacturing facilities.

The decision before you is one that may initially cost Arizona electricity customers about 28 cents more on a typical monthly usage of 1,000 kWh, a reasonable usage figure for Arizona, but about twice the national average (because of your extensive air conditioning). That surcharge could reach as much as perhaps 70 cents per month at these high usage levels once the full 1% SPS requirement is reached, representing a potential rate increase approaching 1% as well. As I have attempted to show, the benefits resulting directly to the Arizona economy should provide returns many times over this investment, so the decision can stand alone as one with a sound economic rationale. But if your electricity restructuring produces the desired cost-reduction benefits, then these will eventually not be "increases" in customer bills at all, but rather only slightly lessened decreases in the average customer bills—a remarkably painless way to introduce a public benefit of this potential value to Arizona.

Finally, any kind of imposed "standard" may seem to some in public office to be an unwarranted government intrusion ("mandate") in the financial affairs of Arizona citizens, representing an undesirable trend to "bigger government". But each and every condition ("rule") placed upon electricity providers that will engage in the Arizona electricity market following restructuring of the industry will also set controls on the operation of the Arizona electricity market, to guide this new competitive commerce in the public interest, just as the stock market which operates in a competitive economy has stringent rules to guide its participants and protect their customers. It is therefore appropriate to view the SPS as but one element in the context of the overall total package of rules that will emerge from your deliberations, rather than as a stand-alone "mandate".

The 1% SPS for Arizona is extremely modest—one might argue too modest in view of the potential economic benefits to the state. But it is an important beginning, and at an important time, when new businesses are watching electric industry restructuring carefully to decide where their markets will be, and hence where they should locate.

It would seem to be in the best interest of Arizona for the Corporation
Commission to protect and implement this policy.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Donald W. Aitken". The signature is fluid and cursive, with the first name "Donald" being the most prominent.

Donald W. Aitken, Ph.D.
Senior Staff Scientist
Energy Division
The Union of Concerned Scientists